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The role and the precariousness of volunteer work in Brazilian protected areas

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ABSTRACT

This study aimed to evaluate the occurrence patterns and role of volunteering in Brazilian protected areas in facing the scenarios of reduced public funds for conservation. Thus, we analyzed volunteer work documents in 210 Brazilian conservation units and carried out a meta-analysis on the proposed objectives, activities offered, the prerequisites for participation and the provisions offered to volunteers. Parks have the highest demand for volunteers (i.e. the type of protected area where volunteers are needed the most to perform volunteer work), as well as for the objectives, activities and prerequisites. Volunteering is motivated by objectives associated with providing practical experience, but in activities associated with public use, visitation and infrastructure. The desired profile is associated with adults with advanced education who have experience in the environmental sciences, and there is no incentive for participation by local resident. The provisions offered to volunteers are mainly related to work execution itself, such as accommodation, food and transportation, despite the relatively low supply of training courses and personal protective equipment. We argue that volunteer actions are being encouraged to meet both the need for professionals and the reduced public funds allocated to conservation. In this sense, this incentive has motivated volunteer precariousness, since the ideal volunteer activity motives are distorted, as well as the services rendered. Knowledge of this process is important to assist in planning public policies and initiatives for conservation, as well as in models for restructuring voluntary action that can achieve both the objectives of volunteer action (i.e. inclusion of the surrounding community and society in the conservation), as well as to contribute to advances in the ecology and in the effectiveness of natural area conservation.

1. Introduction

Volunteer work history has its origins linked to the humanitarian actions of individuals dedicated to help others, as in India 274-232 BCE (Hudson, 1999). However, the starting point for volunteer work is related to the works of the first Christian

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churches from 231 CE, where more fortunate families offered gifts to needy and sick people (Kisnerman, 1983). Recently, the essence of volunteering has becoming a commodified and individualized perspective due to the structural emptying of broader social relations within the neoliberal capitalist society (Hustinx and Lammertyn, 2003; Dean, 2015).

The definition of volunteer is within a continuum between broad and pure interpretations (Cnaan et al., 1996), but generally volunteering is defined as a behavior towards benefitting another person, group or organization and also the natural environment when the volunteer performs non-obligatory and unpaid activities (Wilson, 2009; Penner, 2004; Pagès et al., 2017). Its formalization in Brazil only occurred in 1998, with the creation of the Law 9,608, which defined it as "non-remunerated activity provided by a natural person to a public entity of any nature or a private non-profit institution that has civic, cultural, educational, scientific, recreational or personal assistance" (Brasil, 1998).

Following a global trend, the resources allocated to environmental protection in the last twentieth century decades had marked decreases, thus reducing the financial capacity of organizations (public and private) to hire human resources to act in nature conservation. Data from the Chico Mendes Institute of Biodiversity Conservation (*ICMBio*) management reports have confirmed that the reduced number of servers allocated to Brazilian Conservation Units (CU) is a negative feature, especially considering the country's great territorial extension (ICMBio, 2012; ICMBio, 2014) and the large number of CU, with 1435 of Sustainable Use (SU) and 665 of Integral Protection (IP) (MMA, 2018). The federal government resources annually allocated to the federal CU stabilized at approximately R$300,000,000 between 2001 and 2010, while the CU number increased 83.5%, thus reducing the allocated resources per federally protected hectare by about 40% (Medeiros et al., 2011). The values further reduced in 2017 to R$244,483,082, and the projection for 2018 indicates an even more representative negative reduction to R$122,979,257 (WWF, 2018). In this context, volunteer work has played an important role in Brazilian CU, with *ICMBio* counting 1754 volunteers in 133 units in 2017, thus totaling approximately 2000 volunteer hours (ICMBio, 2017). It is important to emphasize that Conservation Units is the term used in Brazil for a specific group of Protected Areas (PA) which was established by the Law 9985 of 2000, which created the National System of Conservation Units (*SNUC*). There are two management groups in this system, namely the Integral Protection (IP) which corresponds to IUCN categories Ia, Ib and II; and Sustainable Use (SU) which are correspondent to IUCN categories III, IV, V and VI. Seven categories are listed in the first group and there are five in the second.

Although it is very important to the functioning of the conservation system, the volunteering pattern in Brazilian CUs is still not widely known. In this sense, our objective was to evaluate the volunteer work occurrence patterns in Brazilian Conservation Units by analyzing the characteristics of the activities, the volunteers and the interaction between them. This was carried out in order to test the hypothesis that volunteer work has had its role increased due to the precariousness of both structure and public services associated with Brazilian CUs, which in turn has been demonstrated by the lack of incentives and resource allocation, especially to those which carry out public use activities.

2. Methods

2.1. Data collection

In this work we checked all the public registries at the federal and state level for volunteer work in Brazilian CUs which were published in the period from September 20 to December 30, 2017, in public edicts and announcements. The volunteer information provided in the registries for proposals was summarized and organized in the following classes: political region, activities performed by the volunteer, volunteering objectives, target audience and CU provisions to the volunteers. A binary matrix of presence and absence was constructed in spreadsheets for each one of the four classes and their respective attributes, which enabled data classification and hierarchy, thus pointing out the aspects of greater relevance associated to the volunteering in Brazilian CUs.

Along with the pre-defined variables, we performed pilot tests using a spreadsheet software in order to anticipate any possible problems or inconsistencies and to find solutions, thus making some adjustments before proceeding with the final analyzes. As a result, we eliminated CU categories of state programs not listed in Law 9985/2000, state voluntary programs that did not officially declare CU open to volunteers, and CU announcements with insufficient information from the database. We considered CUs which have a specific and complete volunteer edict (we analyzed only the most recent in CUs which had more than one edict) and/or are officially related as open to volunteering by the respective state environmental agencies.

The database for analysis consisted of 36 CU announcements published between January 2010 and December 2017. It is important to point out that the volunteer programs in some states cover all the CUs of its state system, while the CUs open to volunteer work in other states are presented by the program publication on the official internet sites. Therefore, from the total sample of specific CU announcements and state volunteer programs, our final data amounted to 210 CUs that offer activities for volunteers, distributed across ten types of CU (Fig. 1): EPA - Environmental Protection Area; ESEC - Ecological Station; AREI - Area of Relevant Ecological Interest; SDR - Sustainable Development Reserve; NAMO - Natural monument; BIORE - Biological Reserve; EXRES - Extractive Reserve; WRFP - Wildlife refuge; Forest; Parks.

2.2. Data analysis

We first evaluated possible differences in the number of edicts between CU types where volunteer programs were observed. Next, we analyzed the objectives and activities required by the CU, thus evaluating the differences between CU

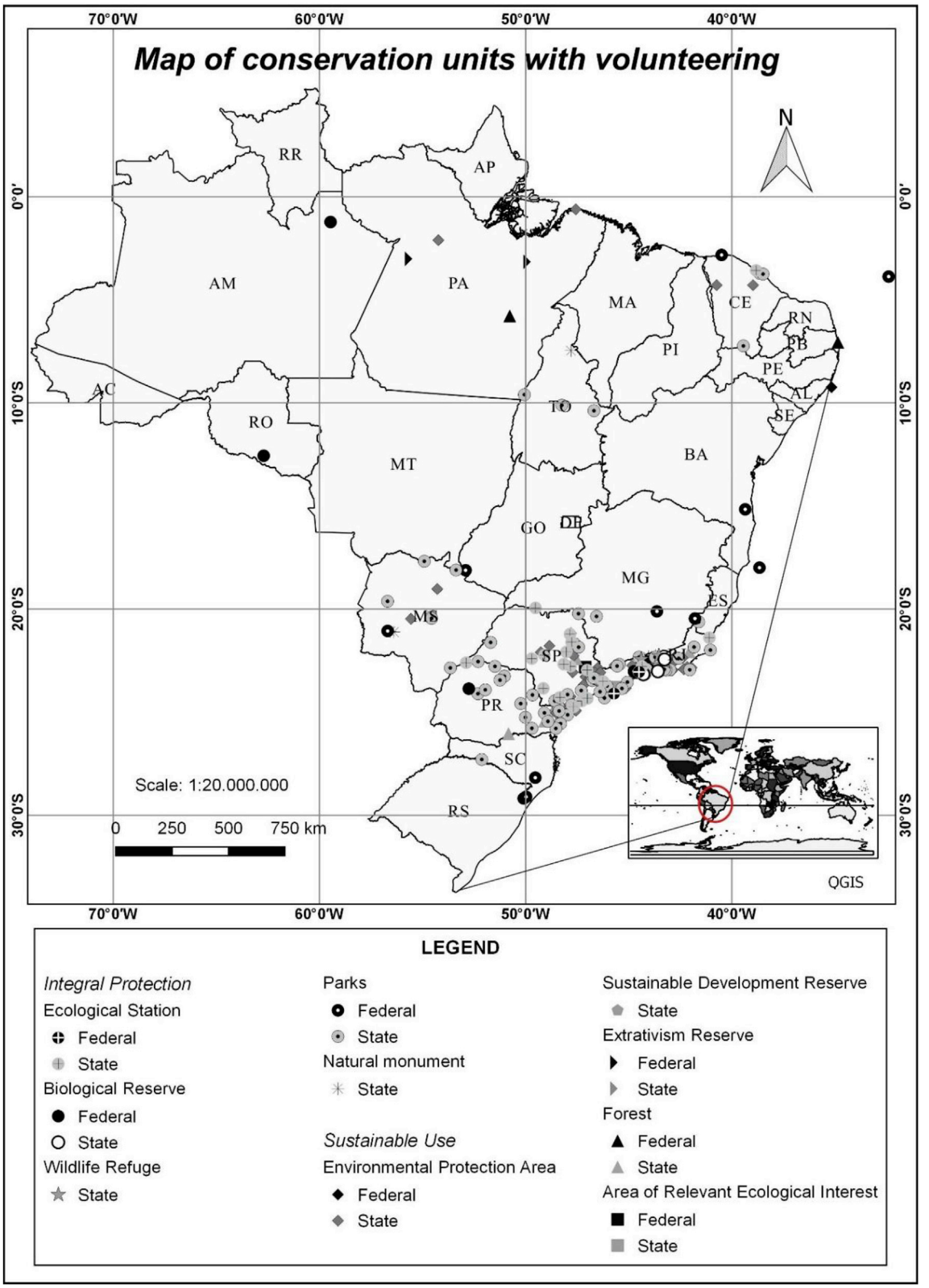

Fig. 1. Localization of the all Conservation Units considered in this study in Brazil, along with the information of each category in the Brazilian Conservation Units System.

types in relation to the number of objectives described and to the number of activities to be performed. Due to the large attributes number of the class "activities performed in CU", we grouped them according to the similarities in six groups of attributes: public use; management/monitoring; infrastructure; fires; first aid; and others, within which there is still a variety of activities (Table 1). We also evaluated if there is a desired volunteer profile by analyzing the desirable characteristics and prerequisites for the volunteer candidates cited in the edicts and CU volunteer programs, thus quantifying the number of times that a given criterion is pointed out. We further evaluated the provisions offered to the volunteers for the work carried out in the volunteer programs, thereby evaluating the number of times that each attribute is cited.

3. Results

The greatest number of volunteers are from the conservation units of the Integral Protection group (IP), 133 (63.3%), while 77 (36.7%) are from the Sustainable Use group (SU). The imbalance factor between the two groups is the presence of parks which stand out with 94 areas presenting demand for volunteers (44.7% of the total) (Fig. 2).

In the same direction, as the parks presented a greater number of volunteers and consequently more edicts, they also stood out for the amount of objectives among all CU categories with 294 or 41.5% of the total citations, while the other nine types totaled 415 citations (58.5%) (Table 2). Among the eight objectives listed in the analyzed documents, the parks stood out for five motivations: visitation (58%); promotion of the CU (50%), human resources to work in various activities (48%); to provide practical experience (48%); Environmental education and interpretation (47%). The second most recurring objective is related to providing practical experience, as listed in 167 CUs of the total of 210 (79.5%) and present in at least one CU of each raised category.

The edicts and volunteer programs vary in the work opportunities offered, which are related to all CU areas (Table 3). The eight activities offered to the volunteers were listed 1481 times for the CUs in the edicts and programs, with more recurring activities being related to public use (418 times) (28.22%) and infrastructure (20.4%) Thus, the public use in parks with 197 activities (13.30% of the total) is of great importance for this category, which mainly calls for activities to work in the visitation (48 times - 19.23%) and in EEII (78−14.10%). In addition, it is also important to point out the importance of the opportunities for volunteers in activities related to infrastructure in parks, which accounted for 142 of the total of 302 citations (47.1% of the total citations in this activity), representing 20.8% of the total activities offered by the parks as a whole. Research is a public use activity which also requires many volunteers not only for the parks (131 citations - 13.24%), since all CUs verified in this study require volunteers for this purpose.

When analyzing the desirable characteristics and prerequisites (Table 4) present in the unit announcements or in the volunteer programs for participation in the 210 analyzed CUs, it was observed that 71 citations about prioritizing people with complete higher education or in training, and being mainly in the parks which totaled 37. Another point to be observed is that the target audience in 59 of these citations is people with specific knowledge, professionals trained or in training in the environmental sciences area. On the other hand, the participation of local residents is included in only 15 (2.87%), with 9 of these being parks. The incentive is higher in relation to society in general, however it is present only in 22 CU (4.2%), of which 17 are parks. Among them, the volunteer program in the Paraná state stands out with 13 CUs (36.1%). Only four PARNA and one *APA* offered vacancies for people under 18 years of age. In addition, the provision of training to carry out the activities were observed in only 21 (10.9%) among the analyzed documents (Fig. 3). Another important point related to the activities is the volunteer's safety, with only 14 (7.25%) documents specifying the availability of personal protective equipment (PPE), thus exposing the volunteer to risks and harming their work efficiency.

4. Discussion

The occurrence of volunteer work in Brazilian CUs is marked by the large number of volunteers from the Integral Protection group (IP) units (133 units - 63.3%), mainly in Parks, while 77 units (36.7%) are from the Sustainable Use (SU) group. The greater demand for volunteers by IP units is contrary to the total number of Brazilian CUs, in which 68% of the 2146 CU registered in the National Register of Conservation Units (*CNUC*) are from the sustainable use group. The objectives and activities offered are varied, but largely associated with human resources and CU public use, especially those of integral

Table 1
Division of identified attributes in the class of activity performed in the Conservation Unit.

Groups	Attributes
Public use	Research (general, visitation, fauna, flora), visitation (general, reception, conduction), education and environmental interpretation and interaction with the local community.
Planning/Monitoring/ Management	Management, dissemination of Conservation Units (CU), management plan construction, management (insects, exotic species, degraded areas and fauna), monitoring of the impact of visitation, monitoring (visitation, fauna, flora and water)
Infrastructure	Maintenance of trails, infrastructure, cleaning of the CU and nursery
Fires	Fire-fighting and fire-fighting support
First aid	Search and rescue
Others	Elaboration of projects, courses or lectures and others

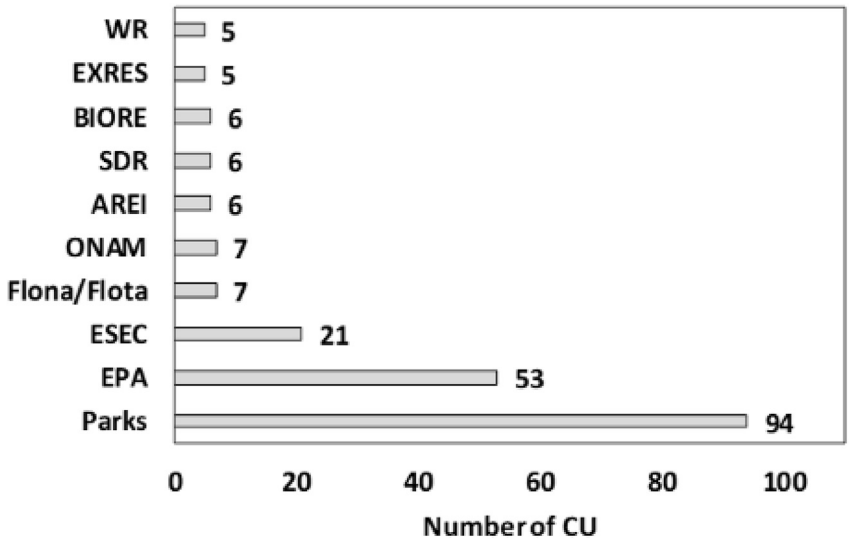

Fig. 2. Relation of Conservation Unit types with volunteer programs in Brazil. Note: EPA - Environmental Protection Area; ESEC - Ecological Station; AREI - Area of Relevant Ecological Interest; SDR - Sustainable Development Reserve; ONAM - Natural monument; BIORE - Biological Reserve; EXRES - Extractive Reserve; WR - Wildlife refuge; Flona/Flota: Public Forest; Parks: Public Parks.

Table 2
Relation of the main objectives of the volunteer programs in Federal and State Conservation Units in Brazil. Human resources are activities not previously defined by the CU or program announcement, but are related to the general scope of CU activities (n = 71). Note: CU: Conservation Units; EEI: Environmental education and interpretation; Monit - Monitoring; EPA - Environmental Protection Area; ESEC - Ecological Station; AREI - Area of Relevant Ecological Interest; SDR - Sustainable Development Reserve; NAMO - Natural monument; BIORE - Biological Reserve; EXRES - Extractive Reserve; WR - Wildlife refuge; Flona/Flota: Public Forest; Parks: Public Parks.

Objectives/CU	Parks	Esec	Biore	NAMO	WR	EPA	AREI	Flona/Flota	SDR	EXRES	Total
Human resources	85	5	2	7	5	53	5	5	6	4	177
Practice experience	80	4	2	3	4	53	5	6	6	4	167
Participative management	31	3	2	2	4	50	5	4	6	5	112
EEI	54	18	4	3	5	17	4	2	5	3	115
CU Promotion	12	2	0	0	0	4	4	1	0	1	24
Visitation	11	2	0	0	0	4	0	0	0	2	19
Monit. and management	15	1	0	4	0	36	2	1	1	3	63
Research	6	17	4	0	1	1	1	1	0	1	32
Total	294	52	14	19	19	218	26	20	24	23	709

Table 3
List of activities offered in the volunteer programs in Conservation Units in Brazil. Groups divided according to Table 2 (n = 71). Note: CU: Conservation Units; PU: Public Use; PU-P: research; PU-V: visitation; UP-EEII: Environmental education, interpretation and interaction; Fires: Combat and support to fires; EPA - Environmental Protection Area; ESEC - Ecological Station; AREI - Area of Relevant Ecological Interest; SDR - Sustainable Development Reserve; NAMO - Natural monument; BIORE - Biological Reserve; EXRES - Extractive Reserve; *WR* - Wildlife refuge; Flona/Flota: Public Forest; Parks: Public Parks.

Activities/CU	Parks	Esec	Biore	NAMO	WR	EPA	AREI	Flona/Flota	SDR	EXRES	Total
PU - R	71	3	4	5	0	36	6	2	1	3	131
PU - V	48	1	0	5	0	37	4	2	1	2	100
PU - EEII	78	21	5	3	5	52	5	7	6	5	187
Planning	112	21	4	7	5	84	10	6	7	7	263
Management	72	17	0	7	0	42	5	2	1	2	148
Monitoring	70	20	4	2	1	48	5	2	6	6	164
Infrastructure	142	6	6	6	6	98	11	9	12	6	302
Fires	43	1	0	1	0	35	4	1	1	2	88
First aid	42	1	0	1	0	35	4	1	1	2	87
Others	5	1	0	0	4	1	0	0	0	0	11
Total	683	92	23	37	21	468	54	32	36	35	1481

Table 4
Relation of the desirable characteristics and prerequisites of the candidates to volunteer in the edicts and programs of volunteering in Conservation Units in Brazil. Note: CU: Conservation Units; Pre-req: Prerequisites; US: University Students; ES: Environmental Sciences; >18 and < 18: people more or less than 18 years old; EPA - Environmental Protection Area; ESEC - Ecological Station; AREI - Area of Relevant Ecological Interest; SDR - Sustainable Development Reserve; NAMO - Natural monument; BIORE - Biological Reserve; EXRES - Extractive Reserve; WR - Wildlife refuge; Flona/Flota: Public Forest; Parks: Public Parks.

Pre-req/CU	Parks	ESEC	Biore	NAMO	WR	EPA	AREI	Flona/Flota	SDR	EXRES	Total
US-ES	14	2	2	0	1	4	1	2	0	1	27
US-Others	12	2	0	0	1	4	0	1	0	1	21
>18	81	19	3	6	4	53	4	7	6	5	188
General Society	17	1	0	0	0	0	0	3	0	1	22
ES Professionals	9	2	2	0	1	4	1	2	0	0	21
Local residents	9	1	0	0	0	2	0	1	0	2	15
Internal attributes	7	0	3	0	0	2	0	1	0	2	15
Experience	8	2	0	0	0	2	1	1	0	0	14
Specific knowledge	5	1	1	0	1	0	1	0	0	2	11
<18	49	18	3	5	4	46	4	2	6	3	140
Physical condition	16	1	4	4	4	13	1	0	1	1	46
Knowledge about CU	1	0	0	0	0	0	0	0	0	0	1
Professor	1	0	0	0	0	0	0	0	0	0	1
Researcher	1	0	0	0	0	0	0	0	0	0	1
Total	230	49	18	15	16	130	13	21	13	18	523

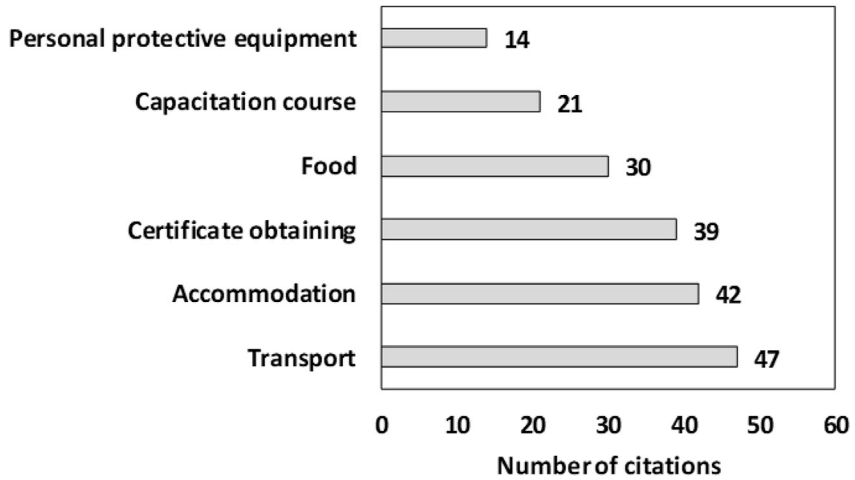

Fig. 3. Number of CU which offered each of the provisions in volunteer programs in Conservation Units in Brazil.

protection. The desired volunteer profile for CUs is related to adults with a high education level, with no special incentives for local community participation.

The higher demand for volunteer work in parks among the CU types may be related to their greater requirement of human resources to reach their broad objectives, especially those related to public use (education and environmental interpretation, visitation and scientific research), and to their need for greater financial contribution. Parks are a CU type which were created to be visited since their genesis in Yellowstone (1872) and Yosemite (1890), as registered in the gateway of the former: "For the Benefit and Enjoyment of the People". It was not different in Brazil, with the first national parks of Itatiaia (1937), Serra dos Órgãos and Iguaçu (1939) already having facilities to receive tourists in their limits since their creation (Diegues, 2011). As stated by Muanis et al. (2009), a public park open to the public comes to cost twice as much another closed park, with annual values varying between R$440 thousand and R$775 thousand, excluding employee expenses. In this sense, volunteer work appears to be used to supply the lack of human resources required for managing PAs, since most of the objectives related in documents and programs sought human resources to carry out various activities within the PA, appearing in 177 (24.9%) of the 709 citations declared in the analyzed documents. As stated by Hodgkinson and Weitzman (1992), "[…] million full-time employees and billions of dollars in unpaid wages." In a neoliberal society, volunteering "fills the gaps that the market cannot, and provides services that the state is not willing to provide or cannot afford" (Dean, 2015).

The highlight of the objective "to offer practical experience" (almost 80% of CUs) apparently follows the guidelines of the *ICMBio* Volunteer Program, which aims to "promote society's engagement in biodiversity conservation" (ICMBio, 2017, p.25). However, studies on the motivations of environmental volunteers, despite presenting relevant variations, point out that

practical experience is not listed among the main ones. For example, in the US, "saving the environment" is the main motivation with 44%, and learning from volunteering is the weakest motivation with only 1.4% (Bruyere and Rappe, 2007). In Australia, the ethical issue of caring for the environment was the main one, followed by the affective connection with the place and the willingness to contribute to the local community (Measham and Barnett, 2008). In Canada, volunteers also saw volunteering as a way to contribute to environmental protection either by individual need or as a legacy to those not concerned with nature conservation (Halpenny and Caissie, 2003).

In this sense, obtaining practical experience does not seem to be a goal that is among the volunteer's motivations in other countries, a fact that may be preventing greater participation by Brazilian society, demotivating those who have already participated to participate again if their motivations are not met (Clary and Snyder, 1999). Grese et al. (2000) point out that programs which incorporate the volunteer's motivations may increase the possibility of success, which is not limited to the ability to attract them, but also to keep them as participants. Unlike the volunteer programs in PA of other countries like Germany (Bremer and Graeff, 2007), in Brazil there are clear activities to be developed by the volunteers, theoretically by the Work Plan prepared in conjunction with the Decentralized Unit (ICMBio, 2016).

The results have also evidenced the CUs preference for specialized and free labor to the detriment of the local resident's participation, which lead to losses in important opportunities for the CU when choosing this profile. According to Gooch (2003), attachment to a given environment is a motivating factor for some people to volunteer when they seek to care for such a place at the same time as wanting to understand it better. Also, the most important thing that is lost when the CU is not encouraging local resident participation is the opportunity of closeness which could favor a break in the prejudices and barriers established many times in the PA creation, when the local residents believe that they will lose rights to land use (Bremer and Graeff, 2007). These residents living in areas adjacent to Protected Areas in many cases are populations that maintain an intimate interaction with natural environments and have Traditional Ecological Knowledge (TEK) (Berkes et al., 2000), which may contribute to establishing strategies for the biotic and abiotic resource use (Posey, 2002; Berkes et al., 2004; Alves et al., 2016), and consequently for the conservation of protected areas (Diegues, 2011).

The prioritization of volunteers with higher educational level and with experience in environmental sciences is possibly due to the greater trend of this group to undertake voluntary actions due to theoretical knowledge (Wilson, 2009; Penner, 2004), although the importance of education varies according to the volunteering type (Wilson, 2009). However, it is clear that the configuration of contemporary volunteering tends to exclude socially disadvantaged groups (Hustinx and Lammertyn, 2003). The preference for trained volunteers may also be associated with the need for experienced human resources to perform activities with little or no training. The fact that only 10.0% of the edicts and programs explicitly offer preparatory or training courses reinforces our argument and may contradict Ryan et al. (2001), who point out that some activities need specific training and this should be offered by the organizers.

The low supply of personal protective equipment (PPE) draws attention, since many activities proposed in the edicts are carried out in natural areas in which accidents with venomous animals can occur (Ericsson et al., 2006; Silva et al., 2015). The absence of PPEs for voluntary work also negatively influences the permanence and return of individuals to volunteering (Ryan et al., 2001). In this case, insecurity can be the preponderant factor, since the sponsoring organization in the Brazilian voluntary system is not required to produce accident insurance, contrary to countries like Italy and Portugal (Martins, 2003). The IN no. 3 points out the obligation of following the safety procedures and the use of equipment and facilities indicated by the CU administration (article 20) and affirms that the PPE should be described in the edict or in the work plan, if necessary (art. 25) (ICMBio, 2016). However, it is questioned who would provide it and what equipment would be needed/provided, or if it would even be the PPE needed for all activities. As noted by O'Brien et al. (2010), the ignorance of what to expect from volunteering is a barrier to potential volunteers.

The growing demand for volunteers in PAs in Brazil demonstrated here is related to the global trend in the use of volunteer work due to public resource cuts for conservation, as observed in countries such as United Kingdom (Carr, 2002), Canada (Savan et al., 2003), Australia (Abrahams, 2005), and the United States of America (Bruyere and Rappe, 2007); however, it is aggravated due to the increased visitation of natural protected areas (Ryan et al., 2001; Bruyere and Rappe, 2007; Savan et al., 2003; Measham and Barnett, 2008). In Brazil, visitation growth exceeded 100% in ten years in the federal PAs (approximately 3.5 million visitors in 2007 and 8.29 million in 2017) (ICMBio, 2017), while budget cuts on resources for conservation over the past five years have been drastically reduced, with the amounts declining from R$5,860,576,032.54 in 2013 to R$3,278,427,785.00 in 2018. On the other hand, the amounts allocated to CUs are even worse, with the budget proposed for 2018 (R$589 million) being 52% less than in 2017 (R$1, 246 billion) (WWF, 2018). The demand for human resources is an aggravating factor for the scenario of voluntary occurrence in CUs. In 2012, *ICMBio* had a rate of 1 employee for every 18,600 ha of PA (Medeiros et al., 2011), while this number was changed to 1 official for every 70,000 ha of PA only two years later (MMA, 2018). In countries such as South Africa, the United States and Argentina, the number of hectares protected per employee does not exceed 2500 ha (Medeiros et al., 2011).

The environmental volunteer program is a promising tool that can be integrated with other government instruments and thus provide social, physical and mental benefits which may contribute to society's well-being as a whole and to health and resocialization programs (O'Brien et al., 2010). In addition, volunteering in general provides opportunities to acquire new skills, and gain work experience and employment contacts (Cnaan et al., 1996). As an example, education and environmental interpretation activities that together appear 187 times in the edicts and programs are fundamental to the process of sensitizing individuals to pro-environmental attitudes. However, they require specific knowledge and skills to sensitize visitors, which in the absence of objective and honest structuring of volunteering programs ends up being marginalized. In

this sense, the work of volunteers in activities they have not properly prepared for can jeopardize the CU objectives, and still miss the opportunity to attract more sympathizers.

5. Conclusions

Thus, when analyzing how voluntary work is being carried out in the Brazilian PAs, we can see that it is being used to provide labor for all CU types analyzed in this study, especially for Parks. These units need more human and financial resources to maintain their activities, mainly those of public use, identified in this study as those that require more volunteers. Although providing practical experience is one of the most recurrent objectives, this motivation does not appear as important in research on the volunteer's motivations to act in nature conservation, which shows that there was a misconception in the edicts possibly caused by the lack of knowledge about this scientific area by the CU managers. In addition, we verified that the desirable volunteer profile by PAs is restrictive, with preference for those over 18 years of age who study or have studied environmental sciences, and without special incentive to local resident inclusion. The provisions to the volunteers are debatable in most CUs, with little offer of preparatory courses for volunteering, which if effective could contribute to improving participation in activities and consequently improve PA management. In this way, our hypothesis was confirmed, since there is a precariousness of both service and voluntary action, since the objectified service will not be provided with quality, nor will the objective of volunteer activity to offer compensations and benefits to the volunteer be reached.

Declarations of interest

None.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.gecco.2019.e00546.

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